DAVID SHARP, M.B., C.M. (Edin.),

President of the Entomological Society of London. Hon. Memb. Inst. New Zealand, &c. Distinguished as an Entomologist, especially for his knowledge of the order Coleoptera, many of the more intricate groups of which he has studied with reference to their structure, classification, geographical distribution, &c.; is attached to Science, and anxious to promote its progress. Author of the following memoirs:—"On Aquatic Carnivorous Coleoptera or Dytiscidæ," forming Vol. II. (Ser. 2) of the Scient. Trans. Roy. Dubl. Soc., 1879-82; "Memoirs on the Coleoptera of New Zealand" (*ibid.*, 1886); and, with the Rev. T. Blackburn, "Memoirs on the Coleoptera of the Hawaiian Islands" (*ibid.*, 1885); besides upwards of one hundred minor contributions to the Transactions of various Societies in England and on the Continent. Has also just completed a memoir on the Dytiscidæ, Staphilinidæ, &c., of Mexico and Central America, being Coleoptera, Vol. I., Part 2, of Messrs. Godman and Salvin's "Biologia Centrali-Americana" (pp. 824, pls. 19), and is now engaged in studying the Clavicornia and Rhynchophora for the same work. Since 1885 he has written the whole of the Insecta (except the Neuroptera) for the *Zoological Record*.

J. J. HARRIS TEALL, M.A.,

F.G.S. Has taken a leading place among the petrographical geologists of this country, having enriched the literature of the science with important original contributions. Among these, special mention may be made of the following:—"The Patton and Wicken Phosphatic Deposit" (Sedgwick Prize Essay, 1875); "Petrological Notes on some North of England Dykes" (*Quart. Journ. Geol. Soc.*, 1884, p. 209); "On the Chemical and Microscopical Characters of the Whin Sill" (*op. cit.*, p. 640); "The Metamorphism of Dolerite into Hornblende-schist" (*op. cit.*, 1885, p. 133); "The Lizard Gabbros" (*Geol. Mag.*, 1886, p. 481); "On the Origin of certain Banded Gneisses" (*op. cit.*, 1887, p. 484). In 1888 he published a valuable treatise on "British Petrography," containing the results of much original research, and presenting for the first time a general review of the microscopic characters of all known British rocks. In the same year he was appointed to the Geological Survey, where he is specially charged with the investigation of the petrography of the crystalline schists.

RICHARD THORNE THORNE, M.B. (Lond.),

F.R.C.P. Assistant Medical Officer to H.M. Local Government Board. Has made numerous original observations in regard to the spread of disease, and especially on an epidemic of typhoid fever, and its dissemination by water at Caterham and Redhill. Author of "The Use and Influence of Hospitals for Infectious Diseases" (Proc. of the Internat. Sanit. Conference at Rome); and of a large number of Reports on Public Health to the Privy Council and Local Government Board. He was appointed along with Sir W. G. Hunter to represent Great Britain at the International Sanitary Conference of Rome, 1885. Is distinguished for his acquaintance with Sanitary Science, as shown by his being President of the Epidemiological Society, Lecturer on Public Health at St. Bartholomew's Hospital, Examiner in Public Health to the University of Oxford, the University of London, and the English Conjoined Board.

WALTER FRANK RAPHAEL WELDON, M.A.,

Fellow of St. John's College, Cambridge. University Lecturer on the Advanced Morphology of Invertebrates in the University of Cambridge. Author of: (in the *Quart. Journ. Micros. Sci.*, 1883-88) "Note on the Early Development of *Lacerta muralis*"; "On the Head-kidney of *Bdellostoma*"; "On the Supra-renal Bodies of Vertebrata"; "*Dinophilus gigas*"; "*Haplodiscus piger*"; (in the Proc. Zool. Soc., 1884) "On some Points in the Anatomy of *Phœnicopterus* and its Allies"; "Note on the Placentation of *Tetraceros quadricornis*"; "Notes on *Callithrix gigot*"; (in the Proc. Roy. Soc.) "Note on the Development of the Supra-renal Bodies of Vertebrates"; "Preliminary Note on a Balanoglossus Larva from the Bahamas"; Note on the last paper; and a Report of Investigations into the Crustacean Fauna of Plymouth Sound, carried on in the laboratory of the Marine Biol. Assoc., in accordance with instructions from a Committee appointed by the Royal Society.

NOTES.

M. EUGÈNE PELIGOT, the eminent French chemist, died at Paris on April 15. He was born on March 24, 1811. In 1832 he was admitted to the laboratory of J. B. Dumas, and three years afterwards he became Professor of Chemistry at the École Centrale. In 1846 he succeeded Clément Desormes at the Conservatoire des Arts et Métiers; and here, until recently, he continued to deliver courses of lectures on general chemistry. He also lectured at the National Agricultural Institute on analytical chemistry applied to agriculture. For more than 40 years he was connected with the French Mint, and at the Hôtel des Monnaies he lived and died. M. Peligot was elected a member of the Paris Academy of Sciences in 1852, and in 1885 he received the dignity of a Grand Officer of the Legion of Honour.

THE death of Dr. F. Soltwedel, Director of the Botanical Station at Semarang, in Java, is announced. He was a very energetic botanist, especially in the direction of applied botany.

WE learn from the *Botanisches Centralblatt* that Mr. Thomas Hanbury, of Mortola, near Mentone, has offered to defray the expense of the erection of a building in the Botanic Garden at Genoa, to provide a laboratory, lecture-rooms, and space for botanical collections. The building is to become the property of the University of Genoa, and will be erected under the direction of Prof. Penzig, the Director of the Botanic Garden; and it is hoped that it will be completed by the time of the International Botanical and Geographical Congress to be held in Genoa at the time of the great Columbus Festival in 1892. It is intended that the new Institute shall bear the name of the "Hanbury Botanical Institute."

DURING his visit to the Canaries, in 1889, made for the purpose of taking observations on the atmospheric absorption of the solar spectrum, Prof. O. Simony, of Vienna, landed upon the lonely rock of Zalmo, near the Island of Ferro, and discovered a very curious lizard, which was subsequently described by Prof. Steindachner (*Anz. k. Ak. Wiss. Wien*, 1889, p. 260) as *Lacerta simonyi*. At the request of Lord Lilford, Canon Tristram has also recently visited the same spot, and obtained some examples of this lizard, which Lord Lilford has presented to the Zoological Society's collection. Simony's Lizard is a fine large species, very dark in colour, but obviously allied to the well-known *Lacerta ocellata* of Southern Europe.

THE fifth of the series of photographic exhibitions at the Camera Club, will be open for private and press view on Monday, May 5, at 8 p.m., and on and after Tuesday, May 6, it will be open to visitors on presentation of card. It will consist of photographs by the late Mrs. Julia Cameron.

THE French Exhibition, which is about to be opened at Earl's Court, will illustrate the arts, inventions, products, and resources of France and her colonies, and will, it is said, include many of the best objects shown at the Paris Exhibition of last year.

AN archæological museum has been established in connection with the University of Pennsylvania. *Science* says it contains—in addition to the American specimens—a fine collection of flints, bronze implements, and pottery from Europe, as well as objects from Asia, Africa, and the South Sea Islands. At the same University a museum of economic botany is about to be formed. It will consist of all kinds of woods, vegetable fibres, grains and drugs, arranged so as to illustrate the processes of manufacture from the raw product, and the various uses to which each material may be put.

THE Marine Biological Laboratory at Wood's Holl, Massachusetts, will hold its third session during the approaching summer. The Institution has been so successful that a library, a lecture-room, and six private laboratories have lately been added to it.

THE following are the arrangements for the science lectures to be given at the Royal Victoria Hall during May:—May 6, birth and death of mountains, W. W. Watts; May 13, London water supply, Prof. Bonney; May 20, how a photograph is taken, Dr. J. A. Fleming.

DR. H. ROSS has been appointed Lecturer on Botany at the University of Palermo, and Dr. G. B. De Toni Lecturer on Botany at the University of Padua.

MOROT'S *Journal de Botanique* for March 1 contains an interesting biographical sketch of the late M. E. Cosson, together with a bibliography of his numerous contributions to botanical literature.

AT the last meeting of the Scientific Committee of the Royal Horticultural Society, the Rev. C. Wolley Dod gave an account of several diseases of plants in his garden, and commented on the difficulty of finding curative means, or of hearing of other suggestions than burning. He first alluded to a species of smut (Ustilago) on *Primula farinosa*, which appeared to be indigenous, as the plants were collected in Lancashire; and although it was grown with *P. denticulata*, the smut was confined to the former species. *Æcidium ficariæ* had attacked his hellebores. In this case, a drier soil was suggested as likely to prove effective in ridding the plants of the fungus. The "Lily spot," due to *Polyactis cana*, usually appearing late in summer, had been seen in April upon tulips, and apparently the same species on daffodils. It was suggested that a mixture of sulphate of copper and quicklime would prove effective, as in the case of vines. *Puccinia Schrateri* had occurred on daffodils from Portugal, and also upon the common double sorts.

AT the meeting of the Society of Arts on April 23, Mr. W. Whitaker read a paper on "Coal in the South-East of England." Afterwards some remarks were offered by Mr. Topley, Prof. Rücker, Prof. McKenny Hughes, Dr. Archibald Geikie, who presided, and the author of the paper. Dr. Geikie said he thought everyone present must share his feeling of surprise and pleasure at finding that a number of geologists could come together and discuss a question like this with so little difference of opinion, and it might be taken as strong evidence that on this particular question there was nothing to fight about. He knew of no recent instance where a true scientific induction had been followed with such brilliant success as the one now brought forward. It had been discussed more or less academically by geologists for some sixty years, bit by bit evidence had accumulated as they went further and further below the surface, and at last it had been definitely proved that coal existed in the south-east of England. An ordinary observer would have found it almost impossible to imagine, when standing on a sunny day in the south of Kent, that coal was to be found there hundreds of miles from the great coal-fields, and it would be difficult to make such a person understand why geologists should pitch upon such a spot as a likely place for a colliery. Mr. Whitaker had gone over the evidence, and everyone must have realized how the conclusion had been arrived at, and how admirably the inference had been proved by experiment. But, as Prof. Hughes had said, they were very far from having reached a complete picture of the geography of the rocks that underlie the Secondary rocks of the south-east of England. They were groping their way by degrees, and in the process coal had been discovered. He did not imagine there could be any large continuous coal-field there; it could only exist in detached basins (even allowing for overthrusts), separated by uprises of older rocks. Further to the west they knew nothing by actual borings, and in no other way could anything like a map of the subterranean geology be obtained. It might be surmised with some probability that, between Bristol and the areas where borings had been made, there might be more extensive coal-fields than were at all likely to be found in the extreme south-east. They had heard of the wonderful plication of the Carboniferous strata in the west of France, but it must be remembered that not only had the Coal Measures undergone these movements, but the secondary rocks which overlay them had also been crushed, folded, and pushed over each other in the manner which any one might see on the south coast of Dorsetshire; and this process must have considerably thickened the Secondary rocks, the consequence of which was that you might bore through the same stratum sometimes a very long way. It was absolutely necessary that, in the prosecution of this matter, the practical man should go hand in hand with the man of science, otherwise a great deal of time, money, and labour would be wasted.

THE Norwegian Government has laid before the Storthing a proposal to the effect that two-thirds of the cost of the Norwegian Polar Expedition under the command of Dr. Frithjof Nansen shall be defrayed by the State: the conditions being—that the expenses do not exceed 200,000 kroner (about £10,000); that if the expedition proves successful the vessels and scientific instruments used during the voyage shall become the property of the State; and that the Christiania University shall receive such specimens from the scientific collections as the senate shall select.

THE Director of the Observatory at Tusa, in Sicily, noted two short but severe shocks of earthquake at noon on April 15. No damage was caused.

A SHOCK of earthquake was felt at Lisbon on the morning of April 28.

M. E. LEYST, Superintendent of the Observatory of Pawlowsk, near St. Petersburg, has contributed to vol. xiii. of the *Repertorium für Meteorologie* an important investigation upon the influence of the times of reading the maximum and minimum thermometers upon the results deduced from them.

THE Administration Report of the Meteorological Department of the Government of India for the year 1888–89 gives an account of some important changes in the working of the service since January 1, 1889. The change of the hour of morning observations from 10 a.m. to 8 a.m. has accelerated the publication of the Daily Weather Reports, and this result is much appreciated in Calcutta and Bombay. A uniform system of rainfall observations throughout India, and the telegraphing of rainfall information to Simla, enable the Department to prepare comprehensive rainfall charts and tabular statements for each week during the monsoon season. A local Daily Weather Report and Chart is now prepared at Bombay, in order to give early information to the commercial community, in a form similar to the Reports published at Calcutta. The Bombay Chamber of Commerce has contributed liberally towards the expenses of this service. The collection of information from ships in the Arabian Sea and Bay of Bengal is to be extended. This is essential for the investigation of the causes of the origin of storms; and, if sufficient material be collected, charts will be prepared for each day for two or three years. The charts must necessarily appear about three months after date. The work of observation with regard to storms is acknwledged to have been hitherto very defective. A small payment will be made in future for this service, and several valuable series of observations during dust-storms, &c., have already been received. The staff in India being insufficient to discuss the mass of material which has accumulated during the last 13 years, the Government has wisely given a grant for the discussions of the more important series to be carried out by distinguished meteorologists in Europe. Several important investigations by the Indian staff are in a more or less advanced state of preparation, including an account of the cyclonic storms of August 1888, and of September 13–20, 1888; a paper on the relation of sunspots to weather, as shown by meteorological observations in the Bay of Bengal from 1855–78; and an account of the storm in the Arabian Sea in June 1887. At the commencement of the year under report, there were 161 observatories contributing regular observations.

M. P. Lafourcade, in a paper on the great bustard (*Revue des Sciences Naturelles Appliquées*), says that this bird is becoming very scarce in France, as it can flourish only in large uncultivated spaces. In Champagne and Provence it is never found. The small bustard is less rare.

Some observations on the brain-weight of new-born infants are given by Herr Mies in a Vienna medical paper. From 203 weighings he found the brains of male children to weigh on the average 339·3 grammes (say 11·9 oz.), and those of females 330 grms. (say 11·6 oz.). The lightest was 170 grms., and the heaviest 482 grms. The brain-weight of the new born infant is to the body-weight as 1 : 7 to 8·5. Only children living at the time of birth were considered.

At the meeting of the Royal Society of Queensland on February 17, Mr. W. Saville-Kent presented some interesting notes on the embryology of the Australian rock oyster (*Ostrea glomerata*). He mentioned that in connection with the investigation of this subject he had been carrying on a series of experiments with the view of accurately determining the influence upon the embryonic brood that is exercised by the advent of fresh-water floods or other sudden changes in the salinity of the water. Some important results had been obtained. From a series of oysters recently purchased in the market a fully matured male and female were selected for experiment. Portions of milt and ova from these two individuals were abstracted and commingled under precisely the same conditions, and placed respectively in water of three different degrees of salinity. The first admitted was placed in sea-water of the full ordinary strength. In the second there were equal proportions of salt and fresh water, and in the third one part of salt water to three of fresh. As a result, the ova placed in the equal admixture of salt and fresh water exhibited active vitality, and were quickly speeding in their developmental career. Of the ova placed in pure sea-water, but few were fructified, and these developed very slowly. Those, finally, placed in the water containing only a one-fourth proportion of sea-water were entirely deprived of life, and soon began to disintegrate. To this last circumstance Mr. Saville-Kent called special attention. It indicated, he said, the pernicious effect upon breeding oysters that might be exercised by heavy floods, and opened out a wide field for further inquiry.

A paper on the fossil butterflies of Florissant, Colorado, by Mr. Samuel H. Scudder, is included in the eighth Annual Report of the Director of the United States Geological Survey, and has now been reprinted separately. The specimens were found "in presumably Oligocene beds." There are altogether seven species, and they all belong to extinct genera. Their general aspect is "distinctly sub-tropical and American, while the Tertiary butterfly fauna of Europe is derived in the first place rom the East Indies, in the second from sub-tropical America, and in the third from home." With regard to one interesting point Mr. Scudder writes as follows:—"In living butterflies, as we ascend the scale of families we find an increasing atrophy of he front legs. In the two lower families, *Hesperidæ* and *Papilionidæ*, they are similar in structure to the other pairs, being normally developed. In the *Lycænidæ* (including in this the sub-families *Lemoniinæ* and *Lycæninæ*) they are atrophied in the male to a greater or less extent, with the loss of the terminal armature, while still perfect in the female. In the highest family, *Nymphalidæ*, with the single exception of the little group *Libytheinæ*, which agrees with the *Lycænidæ*, they are aborted in both sexes, often to an excessive extent. Now, in *Prolibythea* we have the forelegs of the female preserved, and in *Nymphalites* the foreleg of the male; in both cases they agree in all essential points with what we should expect to find in living forms belonging to the same groups, showing that at the earliest epoch at which butterflies are yet known these peculiar differences, marking the upward progression of forms, were already in existence. We must therefore look for the proofs either of great acceleration in development when butterflies first appeared, or of the existence of butterflies at a far earlier period than we yet know them."

In the yearly report of the East Siberian branch of the Russian Geographical Society, it is shown that the Miocene deposits in the middle parts of the provinces of Tomsk and Yeniseisk are much greater in extent and thickness than has hitherto been supposed. They contain, besides thin layers of coal, a rich flora, samples of which have been secured by M. Klementz. Leaves and needles of *Acer*, *Betula*, *Pinus Lopatini*, *Segusia*, *Sternbergi*, *Glyphostrobus*, *Magnolia*, *Ulmus*, *Populus*, and so on, are found in great quantities, and it seems probable that the Miocene flora of Siberia will prove as abundant and as suggestive of changes of climate as that of Switzerland.

An interesting and successful experiment in technical education is described in a resolution of the Indian Education Department, granting an increase of over 16,000 rupees in expenditure on schools in Sind. Appended to the resolution is an extract from a letter of Mr. Jacob, Inspector of Schools, in which he gives some details of the practical system of technical education which has been instituted in the Naushahro schools by Khan Bahadur Kadirdad Khan. The industries taught embrace Sind embroidery, tailoring, joining, and cabinet work, smith's work in iron and brass, electro-plating, mason's work, pottery, &c., and the attendance at all the classes is continually increasing. The boys in the workshops are divided into "gangs," each headed by a senior boy who has displayed exceptional skill. The schools are in close touch with the market; and, as orders come in, they are distributed among the gangs, and the profits of the work are divided among the members of the gang in proportions fixed by the teacher, and regulated by the degree of skill possessed by each individual. The industrial school for girls is most popular, and suggests new possibilities in the extension of female education; for it is found that the opportunity of earning money keeps the girls at school up to a later age than has hitherto been usual. Mr. Jacob says that the schools have created an extraordinary interest among the industrial classes, both Mahomedan and Hindu.

In a paper on the aborigines of Australia, printed in the current number of the Journal and Proceedings of the Royal Society of New South Wales, Mr. W. T. Wyndham speaks of the skill with which the natives use stone implements. "They turn out work," he says, "that you would hardly believe possible with such rough implements. They show great ingenuity, particularly in making their harpoon heads for spearing dugong and fish; instead of shaving the wood up and down with the grain as a European workman would do, they turn the piece of wood for a spear-head round and round, and chip it off across the grain, working it as wooden boxes are turned on a lathe. I have often sat and watched them doing this."

According to an official estimate, there are 170,000 wolves in Russia; and the loss caused by the destruction of sheep and swine by wolves is so great that it cannot be even approximately estimated. The reward paid for each wolf killed is 10 roubles. The number killed in 1889 in the single government of Wologda was 49,000, and in the government of Kasan 31,000. The number of human beings killed by wolves during the year was 203.

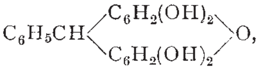
Mr. John Murray has issued an abridged and popular edition of Mr. Paul du Chaillu's "Adventures in the Great Forest of Equatorial Africa and the Country of the Dwarfs." While recognizing the work that has been done by later travellers in the regions with which his name is associated, Mr. du Chaillu says, in his new preface, that, so far as he is aware, no white man has been able since his time "to penetrate to the haunts of the gorilla and bring home specimens killed by himself."

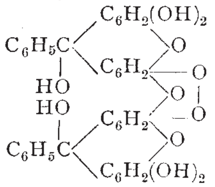
Part 19 of Cassell's "New Popular Educator" has been issued.

We have received "The Medical Register" and "The Dentists' Register" for 1890. Both works are printed and published under the direction of the General Council of Medical Education and Registration of the United Kingdom.

The seventh annual issue of the "Year-book of the Scientific and Learned Societies of Great Britain and Ireland" (C. Griffin and Co.) has been published. It comprises lists of the papers read during 1889 before Societies engaged in fourteen departments of research, with the names of their authors. The work has been compiled from official sources.

The following note on the words "cold-short" and "red-short" appears in *Engineering* of the 25th ult. Some of our readers may perhaps be able to throw light on the subject:—The words "cold-short" and "red-short" are so expressive that their etymology would seem at first sight to be entirely free from difficulty, but such is not the case. The earliest form of "cold-short" occurs in Philemon Holland's translation of Pliny's "Natural History" (1601) where it appears as "colsar." Vernatt and Whitmore, in their patent for the manufacture of iron granted in 1637, speak of "colshire" and "coleshire" iron, whilst Dud Dudley, in his famous tract "Metallum Martis" (1665), calls it "coldshare" iron. A still further variation appears in the Philosophical Transactions for 1693, in the course of a curious paper, written in 1674, giving an account of the hematite ores of Lancashire, where the writer speaks of 'coldshire" and "redshire" iron. Andrew Yarranton, in his "England's Improvement by Land and Sea" (1677), uses the word "coldshore," and in Moxon's "Mechanick Exercises," published in the same year, red-short iron is described as "red-sear." The earliest known instance of "cold-short" and "red-short" is in a rare folio tract of 4 pages bearing the title "Beware of Bubbles," which, though undated, must, from internal evidence, have been issued in 1730. It forms one of a number of broadsides circulating about the time referring to a patent for the manufacture of iron taken out by Francis Wood, the well-known manufacturer of "Wood's halfpence," so unmercifully satirized by Swift in the "Drapier Letters." The words "cold-short" and "red-short" are at the present moment occupying the attention of the editor of the "New English Dictionary on Historical Principles," now in course of publication by the Clarendon Press, and if any of our readers are able to throw light upon the etymology of "cold-short" and "red-short" their suggestions will be gladly welcomed by the editor, Dr. Murray, Banbury Road, Oxford.

A new colouring matter from pyrogallol, $C_6H_3(OH)_3$, and benzotrichloride, $C_6H_5 . CCl_3$, is described in the current number of *Liebig's Annalen*, by Drs. Doebner and Foerster, of the University of Halle. When pyrogallol and benzotrichloride are heated to 160° C. in the proportion of two molecules of the former to one of the latter until no more hydrochloric acid is evolved, a fused mass is obtained which dissolves in alkalies with the production of a fine blue colour. The powdered product of the fusion is of a dark brown colour with a greenish metallic lustre. It may be obtained pure from solution in hot glacial acetic acid in the form of dark green crystals, which under the microscope appear as bright red transparent plates by transmitted light. The substance is almost insoluble in water, benzene, or carbon bisulphide, but is more soluble in alcohol and ether, and in hot chloroform. It dissolves in a hot solution of sodium acetate with production of a deep red colour. Caustic alkalies readily dissolve the pure crystals with production of the same blue colour as that yielded by the crude product of fusion. When the solution is just neutralized the colour is a bluish-violet, but the least excess of alkali reproduces the magnificent blue colour. Strong sulphuric acid dissolves the crystals with formation of a soluble sulphonic acid of a fine violet tint. Most metallic salt solutions yield with neutral solutions of the ammonium salt precipitates of the nature of "lakes" of varying composition and of various shades of bluish-violet. The colours produced by salts of aluminium and iron are perhaps the most striking. The yield of the new substance is very good, and generally amounts to about sixty grams of pure crystals for every hundred grams of pyrogallol employed. As regards its composition and constitution, its empirical formula is found to be $C_{38}H_{24}O_{11}$. It evidently contains four phenol hydroxyl groups, for it reacts with acid chlorides and anhydrides with production of compounds containing four acid radicals. The acetyl compound, $C_{38}H_{20}O_{11}(C_2H_3O)_4$, forms bright red crystals, melting at 208° C., which are decomposed by soda with formation once more of a blue colour. The benzoyl compound, $C_{38}H_{20}O_{11}(C_7H_5O)_4$, consists of thin red prisms possessing a brilliant green lustre, and melting to a deep red liquid at 251°. The substance also yields a hydro-reduction product with zinc dust and glacial acetic acid of the composition $C_{19}H_{14}O_5$; this reduction-product forms beautiful long colourless needles of silky lustre, which rapidly reoxidize in air, and especially on heating, to the original compound. Even if the needles are allowed to remain a short time in their mother-liquor they gradually become tipped with red, exhibiting an exceptionally pretty effect. The constitution of this hydro-body is shown to be  $C_6H_5CH\begin{matrix} \diagup C_6H_2(OH)_2 \diagdown \\ \diagdown C_6H_2(OH)_2 \diagup \end{matrix}O$, from which, taking into account the fact that four phenol hydroxyl groups are shown to be present by the mode of reaction with acid chlorides and anhydrides, the constitution of the new colouring matter is concluded to be as follows:—



The name which the discoverers propose for the compound is pyrogallol-benzeïn.

The additions to the Zoological Society's Gardens during the past week include a Rhesus Monkey (*Macacus rhesus* ♀) from India, presented by Mrs. Pendry; a Brown Bear (*Ursus arctos* ♂) from Russia, presented by Miss Evelyn Muir; a Bateleur Eagle (*Helotarsus ecaudatus*) from East Africa, presented by Dr. E. J. Baxter; an Elliot's Pheasant (*Phasianus ellioti* ♀) from China, a Cape Weaver Bird (*Hyphantornis capensis* ♂) from South Africa, a Red-eyed Ground Dove (*Pipilo erythrophthalmus*) from North America, presented by Mr. Wilfred G. Marshall; a

Tuatera Lizard (*Sphenodon punctatus*) from New Zealand, presented by Mr. J. Catheson Smith; an Egyptian Ichneumon (*Herpestes ichneumon*) from North Africa, two Grey Ichneumons (*Herpestes griseus* ♂ ♂), two Alexandrine Parrakeets (*Palæornis alexandri*) from India, two White Pelicans (*Pelecanus onocrotalus*), South European, deposited; a Musk Deer (*Moschus moschiferus* ♂) from Central Asia, seven Bearded Lizards (*Amphibolurus barbatus*), three —— Lizards (*Amphibolurus muricatus*), a Gould's Monitor (*Varanus gouldi*) from Australia, purchased; a Barnard's Parrakeet (*Platycercus barnardi*) from South Australia, received in exchange; an Indian Muntjac (*Cervulus muntjac*), born in the Gardens.

OUR ASTRONOMICAL COLUMN.

OBJECTS FOR THE SPECTROSCOPE.

Sidereal Time at Greenwich at 10 p.m. on May 1 = 12h. 39m. 6s.

Name.	Mag.	Colour.	R.A. 1890.	Decl. 1890.
			h. m. s.	° ′
(1) G.C. 2917	—	—	12 18 50	−18 10
(2) δ Virginis	3	Yellowish-red.	12 50 6	+ 4 0
(3) ε Virginis	3	Yellowish-white.	12 56 42	+11 33
(4) ρ Virginis	5	Yellowish-white.	12 36 18	+10 51
(5) Z Virginis	Var.	—	12 28 12	− 3 49
(6) Comet *a* 1890, May 1	—	—	20 59 31	+30 12
,, ,, 2	—	—	58 23	+31 2
,, ,, 3	—	—	57 10	+31 53
,, ,, 4	—	—	55 51	+32 44

Remarks.

(1) During his spectroscopic survey of nebulæ in 1868, Lieut. Herschel noted that this gave a bright line spectrum. The three principal nebular lines and G were observed, but, as I have before remarked, other lines may possibly be found if carefully looked for. Some of the lines observed in other nebulæ, namely D_3 and lines near λ 559, 521, 517, 470, and 447, may be expected. In the General Catalogue the nebula is described as "Very bright; large, round; very suddenly much brighter in the middle to a nucleus; barely resolvable."

(2) According to Secchi, Vogel, and Dunér, this star has a magnificent spectrum of Group II., all of the ten ordinary bands being well visible. The band near D and the one less refrangible (Dunér's 2 and 3) are very wide, but the others are relatively narrow, though strongly marked. Dunér notices the peculiarity that band 5 (λ 546) is double. This should be further examined; the apparent duplicity may be simply due to the superposition of a strong line upon the dark fluting of lead. As the star is an exceptionally bright one for this group, comparisons with the bright flutings of carbon should be made, with the object of further confirming the cometary character of this group of stars.

(3) This is a star which has hitherto been classed with stars like the sun. The usual more detailed observations are required to determine whether the temperature of the star is increasing or decreasing.

(4) A star of Group IV. (Vogel). If the colour given by Vogel is correct, one would expect the metallic lines to be fairly well developed in this star, and it would probably be no longer classed in Group IV. The stars of this group are usually white or bluish-white, the yellowish-white stars generally falling in the later stages of Group III. or the earlier stages of Group V.

(5) The colour and spectrum of this variable have not yet been recorded, as far as I can determine, and the approaching maximum of May 5 may therefore afford a good opportunity of observing it. The range of variability is from 8·0 to 14·0 in a period of about 219 days.

(6) As this comet is travelling northwards and is gradually increasing in brightness, it may be well to note a few of the chief points to which attention should be directed in spectroscopic observations. The positions given are for Berlin midnight, and are reprinted from NATURE, vol. xli. p. 571.

Observations of the spectrum of a comet at one time only are now of little value, as there can be no doubt that the spectrum is subject to changes with the variations of temperature due to varying distances from the sun. The question now is: What is the precise nature of these changes? From a discussion of all the observations made up to 1888, Prof. Lockyer has laid down what he considers to be the most probable sequence; but as yet there has been no opportunity of testing his views by continued observations of one comet. According to his view, the spectrum of a comet near aphelion is like that of a planetary nebula, consisting simply of a bright line near λ 500. This, it will be remembered, was observed by Dr. Huggins in the comets of 1866–67. As the temperature increases, the spectrum of carbon begins to appear; at first the low-temperature spectrum (perhaps better known as the spectrum of carbonic oxide) makes its appearance, and afterwards the spectrum of hot carbon (commonly known as the hydrocarbon spectrum). The principal flutings in the first spectrum are near λ 483, 519, and 561, and those in the second are compound flutings with their brightest maxima near λ 564, 517, and 473. As the temperature goes on increasing, bright flutings of the metals manganese and lead (λ 558 and 546) are added to those of carbon, the chief effect of their presence being a variation in the appearance of the band near λ 564. With a still further increase in temperature, fluting absorptions of manganese and lead replace the corresponding radiations, and apparently shift the position of the citron band from λ 564 to 558 or 546, according to the preponderance of one element or the other. At the highest temperatures, which are only attained by comets which approach very close to the sun, bright lines of sodium, iron, manganese, and other substances, appear, as in Comet Wells and the Great Comet of 1882. (For further details, see Roy. Soc. Proc., vol. xlv. p. 189.)

For comparison spectra, a spirit lamp, and small quantities of magnesium and the chlorides of manganese and lead are all that are likely to be required, unless complete measurements of wave lengths are attempted. The chief fluting in the spectrum of magnesium will serve for comparison with the line 500.

Variations in the form of a comet have not yet been associated with spectroscopic changes.

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COMETS AND METEOR STREAMS.—In the cases of the Leonides and Andromedes, the annexed comet appears to be at the head of the swarms, and Schiaparelli and others have inferred from this fact that a comet is broken up by tidal disturbances. Other influences besides tidal action may cause it however, and M. Bredichin, in his memoir "Sur les étoiles filantes," showed how meteorites became detached from the central condensation by explosions, and describe orbits that differ according to the value of the initial velocity towards the sun, and the angle made by its direction with the radius vector. In a later communication (*Bull. Soc. Impér. des Naturalistes de Moscou*, 1889, No. 4) the form of the orbits generated by explosions in the comet, and their relation to such meteoritic streams as the Leonides and Andromedes, has been investigated. It is noted that in general the less the eccentricity of the generated ellipse, the more clearly marked are periods of maxima in falls of meteors. With the increase of eccentricity the maxima become less marked, and in the case of a parabolic orbit feeble falls occur each year. The regular periodicity of maxima would favour the formation of a meteoritic stream by a single eruption; in some cases, however, a series of eruptions must have taken place. M. Bredichin thinks that in the Leonid stream a single eruption was excessively preponderant, in the Andromedes a series of eruptions would appear to have occurred. Other cases have also been studied in detail. A meteorite is regarded as a portion of a large comet ejected from the parent mass by an eruption, and an investigation of the number of appearances of bright meteors indicates the connection between them and shooting stars, and, as would be expected, both have maxima when the earth is passing through a meteoritic stream. Although the connection between comets and meteorites is not a matter of doubt, the above investigation demonstrates it from a new point of view. It seems most probable, however, that the disintegration of a meteoritic swarm that has entered our system is caused by tidal disturbances as well as the repulsive action which is the cause of a comet's tail.

STELLAR PROPER MOTIONS.—The number of known stars having proper motions is relatively considerable, but they are much dispersed through astronomical records; M. J. Bossert, however, in the *Bulletin Astronomique* for March 1890 gives an excellent synoptical table of such stars. Many calculations are facilitated by such a table, showing the elements that may vary the position of a star; and in a research on the motion of the solar system it is invaluable. All stars are included whose annual motion is 0″·5 or more. The list has been culled from every known catalogue and astronomical record, but the results